BOROSON FALCONER LLC

O'BRIEN LYNCH ABRAHTISTA CONSULTING ENGINEERS

CES Consulting Engineering Services, Inc.

Sheridan Communications and Technology Academy

DESIGNED TO EARN THE ENERGY STAR

The estimated energy performance for this design meets US EPA criteria. The building will be eligible for ENERGY STAR after maintaining superior performance for one year.

★ Lighting Power Reduction

Although this energy conservation measure is not specifically seen as an increase in cost the design team agreed to be both aggressive and specific in lighting design in order to move towards a more efficient 1.0 watts per square foot.

★ High Efficiency Glazing

ASHRAE table B-17 only requires a U-value of 0.57 for glazing in this region for non-residential construction. The glazing specified for the Sheridan School (Viracon VRE 1-59) has a U-Value of 0.27. This high performance glazing adds to the overall insulation of the building envelope.

★ Energy Recovery

The present design indicates energy recovery on all air handling units (except MUA-1). Using the tempered exhaust air to help heat the outside air in the winter (and the reverse in the summer) allows smaller heating and cooling equipment to be used.

★ Heating Plant

The heating plant includes three dual fuel cast iron sectional boilers sized at 40% of the building's peak heating load each (1342 MBH). The heating plant operates with a 20°F ΔT. The present boilers on the drawings are three Burnham Boilers (model V-909A). This model is 80.2% efficient on natural gas and 82.6% efficient on oil.

★ Cooling Plant

The present cooling plant includes two 140 ton air cooled chillers. Each chiller has a remote condenser, sound attenuators, and its own primary chilled water pump. The cooling plant has (1) secondary loop that contains water. The chiller is rated at 9.2 EER or 1.3 kW/ton.

★ Energy Use Intensity (EUI): 105 kBtu/sf/yr
★ Percent CO2 Reduction: 34%
★ ENERGY STAR Design Rating: 86

Annual Savings Statistics

(compared to an average building EPA rating of 50)

★ Annual Energy Savings: 5,558,120.6 kBtu
★ CO2 savings: 244.8 tons CO2

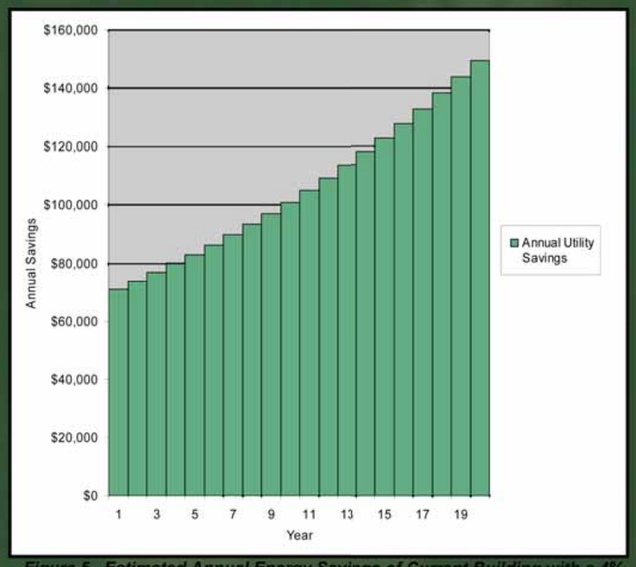

Figure 5. Estimated Annual Energy Savings of Current Building with a 4% Escalation in Utility Bills

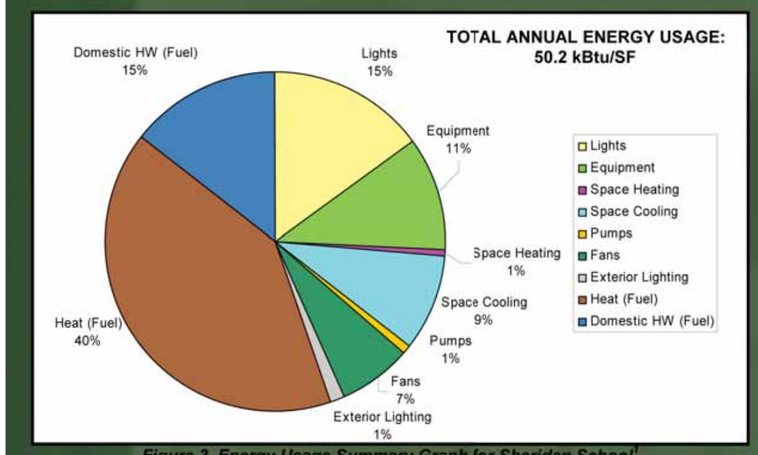

Figure 3. Energy Usage Summary Graph for Sheridan School[1]

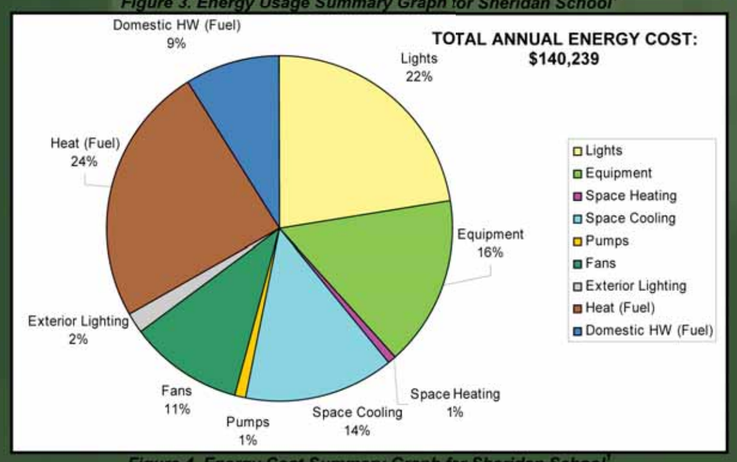

Figure 4. Energy Cost Summary Graph for Sheridan School[1]

Table 1. The Sheridan School Design Comparisons

	ASHRAE Base Case Design	SD Proposed High Performance Building	DD Building as Designed
Walls	1st Existing: U=.121 2/3 Existing: U=.128 Gym: U=.063 Addition: U=.067	1st Existing: U=.121 2/3 Existing: U=.128 Gym: U=.063 Addition: U=.067	1st Existing: U=.121 2/3 Existing: U=.128 Gym: U=.063 Addition: U=.067
Glazing	U = 0.28	U = 0.28	Viracon VRE 1-59 U = 0.27
Slab Insulation	ASHRAE Minimum f = 0.73	Slab on Grade with R-10 Insulation (new construction)	ASHRAE Minimum f = 0.73
Roof	R-30 Roof	R-40 Roof	R-30 Roof
Lighting	1.2 Watt/SF Building Average	1.0 Watt/SF Building Average	0.76 Watt/SF Building Average
Daylight Dimming	None	Daylight Switching in 27 rooms (33% of floor are)	None
Chiller	Air Cooled (1.43 kW/ton)	Packaged Evaporative Cooled with Glycol (0.765 kW/ton)	Indoor condenserless chillers with outdoor air cooled condensers (1.3 kW/ton)
Boilers	2 @ 66% each 2400 MBH each 78.8% Efficient	2 @ 66% each 2400 MBH each 80% Efficient	3 boilers @ 40% each 1342 MBH each 80% Efficient
Energy Recovery	None	AHU1-3, 5, and 8	All units except MUA-1
Economizer	None	All AHU's	All AHU's
DCV	None	Cafeteria & Gymnasium	None

Table 2: ASHRAE 90.1 Budget, Proposed & Energy Conservation Measures

	Model Run	Incremental Costs	Electric Annual Power Usage (kWh)	Fuel Annual Usage (Therms)	Total Energy Usage (kBTU/Sq. Ft./yr)	Annual Utility Cost ($)	Annual Peak Demand (kW)	Present Value Life Cycle Cost
1	ASHRAE 90.1 2001 "Budget"	-	824,622	70,026	98.3	$211,215	732	$3.11M
2	Building as Designed	-	692,057	29,255	50.2	$140,239	498	$2.14M
3	Energy Star Target Finder	-	570,172	33,140	52.6	$143,900	-	$2.19M